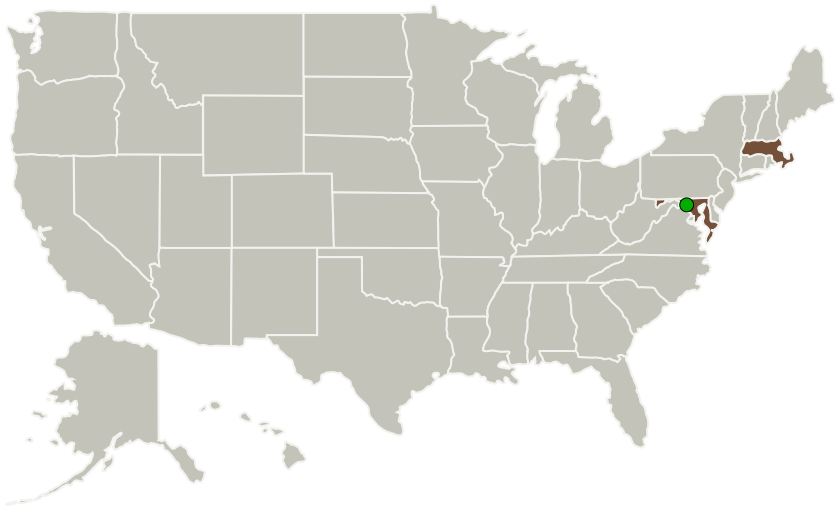
A LIBS System for Lunar Surface Measurements, Phase I

Completed Technology Project (2011 - 2011)

Project Introduction

In response to NASA's solicitation for light-weight and power efficient instruments that enable elemental and/or mineralogy analysis, Q-Peak, together with Firestar Technology and the Colorado School of Mines, proposes to develop a compact, robust and efficient, instrument capable of performing, Laser-Raman Spectroscopy and Laser Induced Breakdown Spectroscopy (LIBS). The main advantages in using these techniques for planetary science is the ability to rapidly collect a wealth of chemical information, by simply directing a laser beam on remote targets of interest. As an important component of the Raman/LIBS instrument, Q Peak proposes to develop, build, and test a miniature Q-switched, solid state laser, producing 1-3 mJ, nanosecond-duration pulses at 526 nm wavelength. We will produce a preliminarily design for integrating the laser into a robotic arm. The proposed work will utilize a low-pressure uLIBS investigation facility, and spectrometer and available at the Colorado School of Mines, and a processing algorithm development begun under an ASTID award. We will initiate the design review to integrate the uLIBS system into the CHAMP-SLS microscope, a spaceflight qualifiable microscope with a laser spectroscopy optical path.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Q-Peak, Inc.	Lead Organization	Industry	Bedford, Massachusetts
Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations	
Maryland	Massachusetts

Project Transitions

February 2011: Project Start

September 2011: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140666)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Q-Peak, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

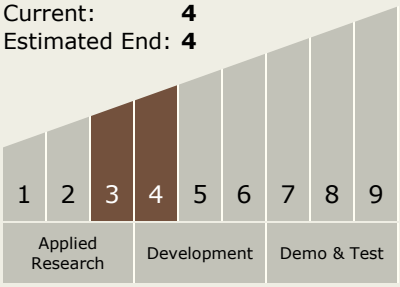
Carlos Torrez

Principal Investigator:

Bhabana Pati

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.5 Lasers

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System